CLAIMS

1. An illuminating device comprising

a first light source for radiating light rays of a first prime color;

a second light source for radiating light rays of a second prime color;

a third light source for radiating light rays of a third prime color;

optical means for refracting divergent light rays, contained in said light rays of the first prime color, radiated from said first light source, said light rays of the second prime color, radiated from said second light source and in said light rays of the third prime color, radiated from said third light source, to collimate said divergent light rays; and

color mixing means for color mixing said light rays of the first prime color, said light rays of the second prime color and said light rays of the third prime color, radiated from said optical means, by selective transmission and reflection based on optical properties of the light rays of the respective prime colors to form white light, and for radiating said white light.

2. The illuminating device according to claim 1 further comprising

an optical component operating so that, when light rays mixed into white light by said color mixing means are incident on a light incident surface of a light guide plate, adapted for guiding the light incident from said light incident surface as said light undergoes total reflection between a light radiating surface and a light reflecting surface as one and the other of the major surfaces of said light guide plate, and for radiating the light thus guided with in-plane light radiation from said light

radiating surface, said white light radiated from said color mixing means will be guided by said optical component so that the totality of said white light will be incident on said light incident surface of said light guide plate.

3. The illuminating device according to claim 1 wherein said first, second and third light sources are light emitting diodes (LEDs).

4. An illuminating device comprising

a first light source for radiating light rays of a first prime color;

a second light source for radiating light rays of a second prime color;

a third light source for radiating light rays of a third prime color;

a first lens for refracting divergent light rays contained in said light rays of the first prime color radiated from said first light source to form collimated light rays;

a second lens for refracting divergent light rays contained in said light rays of the second prime color radiated from said second light source to form collimated light rays;

a third lens for refracting divergent light rays contained in said light rays of the third prime color radiated from said third light source to form collimated light rays;

a first triangular prism having a first light reflecting surface for reflecting said light rays of the first prime color radiated via said first lens;

a second triangular prism having a second light reflecting surface for reflecting said light rays of the second prime color radiated via said second lens;

and

a dichroic prism having a first wavelength selecting transmitting/ reflecting surface and a second wavelength selecting transmitting/ reflecting surface, arranged for intersecting each other in the configuration of a letter X, said first wavelength selecting transmitting/ reflecting surface transmitting said light rays of the third prime color radiated via said third lens and reflecting said light rays of the first prime color reflected by said first light reflecting surface of said first triangular prism; said second wavelength selecting transmitting/ reflecting surface transmitting said light rays of the third prime color radiated via said third lens and reflecting the light rays of said second prime color reflected by said second light reflecting surface of said second triangular prism; said dichroic prism mixing said light rays of the first to third prime colors to form white light, and radiating the so formed white light;

said dichroic prism, said first triangular prism and the second triangular prism being arranged close to one another with the interposition of an air layer.

5. The illuminating device according to claim 4 further comprising

an optical component operating so that, when light rays mixed into white light rays by said dichroic prism are incident on a light incident surface of a light guide plate, adapted for guiding the light incident from said light incident surface as said light undergoes total reflection between a light radiating surface and a light reflecting surface as one and the other of the major surfaces of said light guide plate, and for radiating the light thus guided with in-plane light radiation from said light

radiating surface, said white light radiated from said dichroic prism will be guided by said optical component so that the totality of said white light will be incident on said light incident surface of said light guide plate.

6. The illuminating device according to claim 5 wherein said optical component is an optical block including a white light incident surface of the same shape as a light radiating surface of said dichroic prism radiating the white light, said white light radiated from said light radiating surface being incident on said white light incident surface, a white light radiating surface arranged opposite to said white light incident surface and having at least one side of a length equal to the thickness of said light guide plate, and a pair of reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said white light incident surface to said white light radiating surface as said white light undergoes total reflection.

7. The illuminating device according to claim 5 wherein said optical component is a pair of reflective mirrors arranged with a preset tilt with respect to the direction of thickness of the light guide plate and adapted for guiding the white light radiated from the light radiating surface of said dichroic prism to said light incident surface of said light guide plate as said white light is reflected.

8. The illuminating device according to claim 5 wherein said optical component is an optical block unit made up of a first optical block and a second optical block arrayed along the direction of thickness of said light guide plate;

said first optical block including a first white light incident surface on which

is incident said white light radiated from the light radiating surface of said dichroic prism, a first white light radiating surface arranged opposite to said first white light incident surface and having at least one side of a length not larger than the thickness of said light guide plate, and a pair of first reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said first white light incident surface to said first white light radiating surface as said white light undergoes total reflection;

said second optical block including a second white light incident surface on which is incident said white light radiated from said light radiating surface of said dichroic prism, a second white light radiating surface arranged opposite to said white light incident surface and having at least one side of a length not larger than the thickness of said light guide plate, and a pair of second reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said second white light incident surface to said second white light radiating surface as said white light undergoes total reflection; and wherein

a white light incident surface of said optical block unit, formed by said first and second light incident surfaces, is of the same shape as said light radiating surface of said dichroic prism; said first and second light radiating surfaces being arranged so as to be confined within said light incident surface of said light guide plate.

9. The illuminating device according to claim 4 wherein said first lens, second lens and the third lens are spherical or aspherical lenses.

10. The illuminating device according to claim 4 wherein said first lens, second lens and the third lens are provided with Fresnel lenses on light incident surfaces thereof.

11. The illuminating device according to claim 4 wherein said first light source, second light source and the third light source are light emitting diodes (LEDs).

12. An illuminating device comprising

a first light source radiating light rays of a first prime color;

a second light source radiating light rays of a second prime color;

a third light source radiating light rays of a third prime color;

a fourth light source radiating light rays of said third prime color;

a first lens diffracting divergent light rays contained in said light rays of the first prime color radiated from said first light source to form collimated light;

a second lens diffracting divergent light rays contained in said light rays of the second prime color radiated from said second light source to form collimated light;

a third lens diffracting divergent light rays contained in said light rays of the third prime color radiated from said third light source to form collimated light;

a fourth lens diffracting divergent light rays contained in said light rays of the third prime color radiated from said fourth light source to form collimated light;

a first triangular prism having a first light reflecting surface reflecting said

light rays of the first prime color radiated via said first lens;

a second triangular prism having a second light reflecting surface reflecting said light rays of the second prime color radiated via said second lens;

a first beam splitter prism including a first transmitting/ reflecting surface and a second transmitting/ reflecting surface, said first transmitting/ reflecting surface reflecting linear polarized light oscillating in a first plane of oscillation of said light rays of the first prime color reflected by said first light reflecting surface, transmitting linear polarized light oscillating in a second plane of oscillations perpendicular to said first plane of oscillations, and transmitting linear polarized light oscillating in said first plane of oscillations of said light rays of said third prime color radiated via said third lens and linear polarized light oscillating in said second plane of oscillations, said second transmitting/ reflecting surface transmitting said light rays of the first prime color, reflecting linear polarized light oscillating in said first plane of oscillations of said light rays of the second prime color, and transmitting linear polarized light oscillating in said first plane of oscillations of said light rays of the third prime color radiated via said third lens and linear polarized light oscillating in said second plane of oscillations; said first and second transmitting/ reflecting surfaces being arranged for intersecting each other in the configuration of a letter X;

a second beam splitter prism including a third transmitting/ reflecting surface and a fourth transmitting/ reflecting surface, said third transmitting/ reflecting surface reflecting linear polarized light oscillating in a first plane of oscillations of

said light rays of the second prime color reflected by said second light reflecting surface, transmitting linear polarized light oscillating in said second plane of oscillations, and transmitting linear polarized light oscillating in said first plane of oscillations of said light rays of said third prime color radiated via said fourth lens and linear polarized light oscillating in said second plane of oscillations, said fourth transmitting/ reflecting surface transmitting said light rays of the second prime color, reflecting linear polarized light oscillating in said first plane of oscillations of said light rays of the first prime color, and transmitting linear polarized light oscillating in said first plane of oscillations of said light rays of the third prime color radiated via said fourth lens and linear polarized light oscillating in said second plane of oscillations; said first and second transmitting/ reflecting surfaces being arranged for intersecting each other in the configuration of a letter X; and

a wavelength plate arranged between said first beam splitter prism and said second beam splitter prism for converting linear polarized light oscillating in said second plane of oscillations of said light rays of the first prime color transmitted through said first transmitting/ reflecting surface into linear polarized light oscillating in said first plane of oscillations and for converting linear polarized light oscillating in said second plane of oscillations of said light rays of the second prime color transmitted through said third transmitting/ reflecting surface into linear polarized light oscillating in said first plane of oscillations; wherein

said first beam splitter prism and said first triangular prism are arranged close to each other via an air layer;

said second beam splitter prism and said second triangular prism are arranged close to each other via an air layer; and wherein

said first beam splitter prism and said second beam splitter prism are arranged close to each other via said wavelength plate and an air layer;

said first beam splitter prism mixing linear polarized light oscillating in respective first planes of oscillations of said light rays of the first and second prime colors and linear polarized light rays oscillating in said first plane of oscillations and said second plane of oscillations of said light rays of the third prime color to form white color, and radiating the so formed white light; said second beam splitter prism mixing linear polarized light rays oscillating in respective first planes of oscillations of said light rays of the first and second prime colors and linear polarized light oscillating in said first plane of oscillations and said second plane of oscillations of said light rays of the third prime color to form white color, and radiating the so formed white light.

13. The illuminating device according to claim 12 further comprising

an optical component operating so that, when light rays mixed into white light rays by said first beam splitter prism and the second beam splitter prism are incident on a light incident surface of a light guide plate, adapted for guiding the light incident from said light incident surface as said light undergoes total reflection between a light radiating surface and a light reflecting surface as one and the other of the major surfaces of said light guide plate, and for radiating the light thus guided with in-plane light radiation from said light radiating surface, said white

light radiated from said first beam splitter prism and said second beam splitter prism will be guided by said optical component so that the totality of said white light radiated from said first beam splitter prism and the second beam splitter prism will be incident on said light incident surface of said light guide plate.

14. The illuminating device according to claim 13 wherein said optical component is an optical block including a white light incident surface of the same shape as light radiating surfaces of said first beam splitter prism and said second beam splitter prism radiating the white light, said white light radiated from said light radiating surface being incident on said white light incident surface, a white light radiating surface arranged opposite to said white light incident surface and having at least one side of a length equal to the thickness of said light guide plate, and a pair of reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said white light incident surface to said white light radiating surface as said white light undergoes total reflection.

15. The illuminating device according to claim 13 wherein said optical component is a pair of reflective mirrors arranged with a preset tilt with respect to the direction of thickness of the light guide plate and adapted for guiding the white light radiated from the light radiating surfaces of said first and second beam splitter prisms to said light incident surface of said light guide plate as said white light is reflected.

16. The illuminating device according to claim 13 wherein said optical component is an optical block unit made up of a first optical block and a second

optical block arrayed along the direction of thickness of said light guide plate;

said first optical block including a first white light incident surface on which is incident said white light radiated from light radiating surfaces of said first and second beam splitter prisms, a first white light radiating surface arranged opposite to said first white light incident surface and having at least one side of a length not larger than the thickness of said light guide plate, and a pair of first reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said first white light incident surface to said first white light radiating surface as said white light undergoes total reflection;

said second optical block including a second white light incident surface on which is incident said white light radiated from said light radiating surfaces of said first and second beam splitter prisms, a second white light radiating surface arranged opposite to said white light incident surface and having at least one side of a length not larger than the thickness of said light guide plate, and a pair of second reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said second white light incident surface to said second white light radiating surface as said white light undergoes total reflection; and wherein

a white light incident surface of said optical blocks, formed by said first and second light incident surfaces, is of the same shape as said light radiating surfaces of said first and second beam splitter prisms; said first and second light radiating

surfaces being arranged so as to be confined within said light incident surface of said light guide plate.

17. The illuminating device according to claim 12 wherein said first lens, second lens, third lens and the fourth lens are spherical or aspherical lenses.

18. The illuminating device according to claim 12 wherein said first lens, second lens, third lens and the fourth lens are provided with Fresnel lenses on light incident surfaces thereof.

19. The illuminating device according to claim 12 wherein said first light source, second light source, third light source and the fourth lens are light emitting diodes (LEDs).

20. An illuminating device comprising

a first light source radiating light rays of a first prime color;

a second light source radiating light rays of a second prime color;

a third light source radiating light rays of a third prime color;

a first lens diffracting divergent light rays contained in said light rays of the first prime color radiated from said first light source to form collimated light;

a second lens diffracting the divergent light rays contained in said light rays of the second prime color radiated from said second light source to form collimated light;

a third lens diffracting divergent light rays contained in said light rays of the third prime color radiated from said third light source to form collimated light;

a first reflecting plate having a light reflecting surface reflecting said light

rays of the first prime color radiated via said first lens;

a first beam splitter plate having a first wavelength selecting transmitting/ reflecting surface for transmitting said light rays of the first prime color reflected by said light reflecting surface of said first reflecting plate and reflecting said light rays of the second prime color radiated through said second lens;

a second beam splitter plate having a second wavelength selecting transmitting/ reflecting surface for transmitting said light rays of the third prime color radiated via said third lens and for reflecting said light rays of the first prime color and the second prime color radiated via said first beam splitter plate, said second beam splitter plate mixing said light rays of the first, second and third colors to form white light; and

an optical plate having an angle selecting transmitting/ reflecting surface having angle of incidence dependency of reflecting light incident at an angle not less than a preset angle of incidence and transmitting light incident at an angle less than said preset angle of incidence, said optical plate being arranged downstream of said second beam splitter plate so as to traverse an optical axis formed by said third lens and said second beam splitter plate and being adapted for radiating said white light obtained by color mixing by said second beam splitter plate.

21. The illuminating device according to claim 20 further comprising

an optical component operating so that, when said white light obtained by color mixing by said second beam splitter plate and radiated from said optical plate is incident on a light incident surface of a light guide plate, adapted for guiding the

light incident from said light incident surface as said light undergoes total reflection by a light radiating surface and a light reflecting surface as one and the other of the major surfaces of said light guide plate, and for radiating the light with in-plane light radiation from said light radiating surface, said white light radiated from said optical plate will be guided by said optical component so that the totality of said white light radiated from said optical plate will be incident on said light incident surface of said light guide plate.

22. The illuminating device according to claim 21 wherein said optical component is an optical block including a white light incident surface of the same shape as a light radiating surface of said optical plate radiating the white light, said white light radiated from said light radiating surface being incident on said white light incident surface, a white light radiating surface arranged opposite to said white light incident surface and having at least one side of a length equal to the thickness of said light guide plate, and a pair of reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said white light incident surface to said white light radiating surface as said white light undergoes total reflection.

23. The illuminating device according to claim 21 wherein said optical component is a pair of reflective mirrors arranged with a preset tilt with respect to the direction of thickness of the light guide plate and adapted for guiding the white light radiated from the light radiating surface of said optical plate to said light incident surface of said light guide plate as said white light is reflected.

24. The illuminating device according to claim 21 wherein said optical component is an optical block unit made up of a first optical block and a second optical block, both of which are arrayed with a preset tilt with respect to the direction of thickness of said light guide plate;

said first optical block includes a first white light incident surface on which is incident said white light radiated from a light radiating surface of said optical plate, a first white light radiating surface arranged opposite to said first white light incident surface and having at least one side of a length not larger than the thickness of said light guide plate, and a pair of first reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said first white light incident surface to said first white light radiating surface as said white light undergoes total reflection;

said second optical block includes a second white light incident surface on which is incident said white light radiated from said light radiating surface of said optical plate, a second white light radiating surface arranged opposite to said white light incident surface and having at least one side of a length not larger than the thickness of said light guide plate, and a pair of second reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said second white light incident surface to said second white light radiating surface as said white light undergoes total reflection; and wherein

a white light incident surface of said optical block, formed by said first and second light incident surfaces, is of the same shape as said light radiating surface of said optical plate; said first and second white light radiating surfaces being arranged so as to be confined within said light incident surface of said light guide plate.

25. The illuminating device according to claim 20 wherein said first lens, second lens and the third lens are spherical or aspherical lenses.

26. The illuminating device according to claim 20 wherein said first lens, second lens and the third lens are provided with Fresnel lenses on light incident surfaces thereof.

27. The illuminating device according to claim 20 further comprising

a second reflective plate for reflecting said light rays of the first prime color, not incident on said first beam splitter plate, in a direction in which said light rays are incident on said first beam splitter plate, and a third reflective plate for reflecting said light rays of the first prime color, not incident on said second beam splitter plate, in a direction in which said light rays are incident on said second beam splitter plate.

28. The illuminating device according to claim 27 wherein said second reflective surface includes a reflective surface operating so that, when light rays mixed into white light rays by said second beam splitter plate and radiated from said optical plate are incident on a light incident surface of a light guide plate, adapted for guiding the light incident from said light incident surface as said light undergoes total reflection between a light radiating surface and a light reflecting surface as

one and the other of the major surfaces of said light guide plate, and for radiating the light thus guided with in-plane light radiation from said light radiating surface, said white light will be reflected into the bulk of the light guide plate so as not to leak outward from said light guide plate.

29. The illuminating device according to claim 20 wherein said first, second and third light sources are light emitting diodes.

30. The illuminating device according to claim 20 wherein a light diffusing area is provided on a light radiating surface of said optical plate radiating said white light so that, when light rays mixed into white light rays by said second beam splitter plate and radiated from said optical plate are incident on a light incident surface of a light guide plate, adapted for guiding the light incident from said light incident surface as said light undergoes total reflection between a light radiating surface and a light reflecting surface as one and the other of the major surfaces of said light guide plate, and for radiating the light with in-plane light radiation from said light radiating surface, said white light obtained on color mixing by said second beam splitter is changed in its directivity to the in-plane direction of said light guide plate by said light diffusing area.

31. The illuminating device according to claim 30 wherein said light diffusing area is formed by bonding a prism sheet.

32. The illuminating device according to claim 20 wherein said first reflecting plate is a film on which there has been formed said light reflecting surface, reflecting said light rays of the first prime color, by vapor-depositing a reflective film on a

light radiating surface of said optical plate radiating said white light.

33. A backlight device including a light guide plate guiding the light rays incident thereon from a light incident surface thereof as said light rays undergo total reflection on a light radiating surface and a light reflecting surface as one and the other of the major surfaces of the light guide plate, said light guide surface radiating the light rays by in-plane light radiation from said light radiating surface, said backlight device comprising

a plurality of illuminating devices provided at a preset interval on the light incident surface side of said light guide plate, said illuminating devices each including

a first light source for radiating light rays of a first prime color;

a second light source for radiating light rays of a second prime color;

a third light source for radiating light rays of a third prime color;

optical means for refracting divergent light rays, contained in said light rays of the first prime color, radiated from said first light source, said light rays of the second prime color, radiated from said second light source and in said light rays of the third prime color, radiated from said third light source, to collimate said divergent light rays; and

color mixing means for color mixing said light rays of the first prime color, said light rays of the second prime color and said light rays of the third prime color, radiated from said optical means, by selective transmission and reflection, based on optical properties of the light rays of the respective prime colors, and for radiating

the mixed light rays as white light.

34. The backlight according to claim 33 wherein said illuminating device includes an optical component for guiding said white light obtained on color mixing by said color mixing means so that, when said white light is incident on said light incident surface of said light guide plate, the totality of the white light radiated from said color mixing means will be incident on said light incident surface of said light guide plate.

35. The backlight device according to claim 33 wherein said first, second and third light sources possessed by said illuminating device are light emitting diodes (LEDs).

36. The backlight device according to claim 33 wherein said light incident surface of said light guide plate comprises a pair of opposite lateral sides thereof.

37. The backlight device according to claim 36 wherein, in case said light guide plate comprises a pair of opposite lateral sides of said light guide plate, as said light incident surface, the plural illuminating devices arranged at said preset interval on one of said light incident surfaces and the plural illuminating devices arranged at said preset interval on the other of said light incident surfaces are arranged so that the white light radiating surfaces of said illuminating devices radiating said white light are arrayed with an offset of one half pitch, without facing one another, with said light guide plate in-between.

38. The backlight device according to claim 33 wherein said light incident surface

of said light guide plate is one of lateral sides thereof.

39. The backlight device according to claim 33 wherein a light diffusing area is provided on said light incident surface of said light guide plate for changing the directivity of said white light obtained on color mixing by said color mixing means of said illuminating device so that said white light is diffused along the in-plane direction of said light guide plate.

40. The backlight device according to claim 39 wherein said light diffusing area is formed by bonding a light diffusing sheet and a prism sheet in superposition on said light incident surface of said light guide plate.

41. The backlight device according to claim 39 wherein a reflecting area is provided in a region other than said light diffusing area on said light incident surface for reflecting the white light guided in said light guide plate so that said white light guided will not leak outward from said light guide plate.

42. The backlight device according to claim 41 wherein said reflecting area is formed by bonding a reflective sheet in place.

43. A backlight device including a light guide plate guiding the light rays incident thereon from a light incident surface thereof as said light rays undergo total reflection on a light radiating surface and a light reflecting surface as one and the other of the major surfaces of the light guide plate, said light guide surface radiating the light rays by in-plane light radiation from said light radiating surface, said backlight device comprising

a plurality of illuminating devices provided at a preset interval on the light incident surface side of said light guide plate, said illuminating devices each including

a first light source for radiating light rays of a first prime color;

a second light source for radiating light rays of a second prime color;

a third light source for radiating light rays of a third prime color;

a first lens for refracting divergent light rays contained in said light rays of the first prime color radiated from said first light source;

a second lens for refracting divergent light rays contained in said light rays of the second prime color radiated from said second light source;

a third lens for refracting divergent light rays contained in said light rays of the third prime color radiated from said third light source;

a first triangular prism having a first light reflecting surface for reflecting said light rays of the first prime color radiated via said first lens;

a second triangular prism having a second light reflecting surface for reflecting said light rays of the second prime color radiated via said second lens; and

a dichroic prism having a first wavelength selecting transmitting/ reflecting surface and a second wavelength selecting transmitting/ reflecting surface, arranged for intersecting each other in the configuration of a letter X, said first wavelength selecting transmitting/ reflecting surface transmitting said light rays of the third

prime color radiated via said third lens and reflecting said light rays of the first prime color reflected by said first light reflecting surface of said first triangular prism; said second wavelength selecting transmitting/ reflecting surface transmitting said light rays of the third prime color radiated via said third lens and reflecting the light rays of said second prime color reflected by said second light reflecting surface of said second triangular prism; said dichroic prism mixing said light rays of the first to third prime colors to form white light, and radiating the so formed white light;

said dichroic prism, said first triangular prism and the second triangular prism being arranged close to one another with the interposition of an air layer.

44. The backlight device according to claim 43 wherein said illuminating device includes an optical component which, when said white light obtained on color mixing by said dichroic prism is incident on said light incident surface of said light guide plate, guides said white light, radiated from said dichroic prism, so that the totality of said white light will be incident on said light incident surface of said light guide plate.

45. The backlight device according to claim 44 wherein said optical component is an optical block including a white light incident surface of the same shape as a light radiating surface of said dichroic prism radiating the white light, said white light radiated from said light radiating surface being incident on said white light incident surface, a white light radiating surface arranged opposite to said white light

incident surface and having at least one side of a length equal to the thickness of said light guide plate, and a pair of reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said white light incident surface to said white light radiating surface as said white light undergoes total reflection.

46. The backlight device according to claim 44 wherein said optical component is a pair of reflective mirrors arranged with a preset tilt with respect to the direction of thickness of the light guide plate and adapted for guiding the white light radiated from the light radiating surface of said dichroic prism to said light incident surface of said light guide plate as said white light is reflected.

47. The backlight device according to claim 44 wherein said optical component is an optical block unit made up of a first optical block and a second optical block arrayed along the direction of thickness of said light guide plate;

said first optical block including a first white light incident surface on which is incident said white light radiated from a light radiating surface of said dichroic prism, a first white light radiating surface arranged opposite to said first white light incident surface and having at least one side of a length not larger than the thickness of said light guide plate, and a pair of first reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said first white light incident surface to said first white light radiating surface as said white light undergoes total reflection;

said second optical block including a second white light incident surface on which is incident said white light radiated from said light radiating surface of said dichroic prism, a second white light radiating surface arranged opposite to said white light incident surface and having at least one side of a length not larger than the thickness of said light guide plate, and a pair of second reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said second white light incident surface to said second white light radiating surface as said white light undergoes total reflection; and wherein

a white light incident surface of said optical block, formed by said first and second light incident surfaces, is of the same shape as said light radiating surface of said dichroic prism; said first and second light radiating surfaces being arranged so as to be confined within said light incident surface of said light guide plate.

48. The backlight device according to claim 43 wherein said first lens, second lens and the third lens, possessed by said illuminating device, are spherical or aspherical lenses.

49. The backlight device according to claim 43 wherein said first lens, second lens and the third lens, possessed by said illuminating device, are provided with Fresnel lenses on light incident surfaces thereof.

50. The backlight device according to claim 43 wherein said first light source, second light source and the third light source, possessed by said illuminating device, are light emitting diodes (LEDs).

51. The backlight device according to claim 43 wherein said light incident surface of said light guide plate is a pair of opposite lateral sides thereof.

52. The backlight device according to claim 51 wherein, in case said light guide plate comprises a pair of opposite lateral sides as light incident surfaces, the white light radiating surfaces of the plural illuminating devices arranged at said preset interval on one of said light incident surfaces and the white light radiating surfaces of the plural illuminating devices arranged at said preset interval on the other of said light incident surfaces are arrayed with an offset of one half pitch, without facing one another, with said light guide plate in-between.

53. The backlight device according to claim 43 wherein said light incident surface of said light guide plate is one of said lateral sides thereof.

54. The backlight device according to claim 43 wherein a light diffusing area is provided on said light incident surface of said light guide plate for changing the directivity of said white light obtained on color mixing by said color mixing means of said illuminating device so that said white light is diffused along the in-plane direction of said light guide plate.

55. The backlight device according to claim 54 wherein said light diffusing area is formed by bonding a light diffusing sheet and a prism sheet in superposition on said light incident surface of said light guide plate.

56. The backlight device according to claim 54 wherein a reflecting area is provided in a region other than said light diffusing area on said light incident

surface for reflecting the white light guided in said light guide plate so that said white light guided will not leak outward from said light guide plate.

57. The backlight device according to claim 56 wherein said reflecting area is formed by bonding a reflective sheet in place.

58. A backlight device including a light guide plate guiding the light rays incident from a light incident surface of the light guide plate as said light rays undergo total reflection by a light radiating surface a light reflecting surface as one and the other of the major surfaces of the light guide plate, said light guide surface radiating the light rays by in-plane light radiation from said light radiating surface, said backlight device comprising

a plurality of illuminating devices provided at a preset interval on the light incident surface of said light guide plate, said illuminating devices each including

a first light source for radiating light rays of a first prime color;

a second light source for radiating light rays of a second prime color;

a third light source for radiating light rays of a third prime color;

a fourth light source for radiating light rays of said third prime color;

a first lens for refracting divergent light rays contained in said light rays of the first prime color radiated from said first light source;

a second lens for refracting divergent light rays contained in said light rays of the second prime color radiated from said second light source;

a third lens for refracting divergent light rays contained in said light rays of

the third prime color radiated from said third light source;

a fourth lens for refracting divergent light rays contained in said light rays of the third prime color radiated from said fourth light source;

a first triangular prism having a first light reflecting surface for reflecting said light rays of the first prime color radiated from said first lens;

a second triangular prism having a second light reflecting surface for reflecting said light rays of the second prime color radiated from said second lens;

a first beam splitter prism including a first transmitting/ reflecting surface and a second transmitting/ reflecting surface, said first transmitting/ reflecting surface reflecting linear polarized light oscillating in a first plane of oscillations of said light rays of the first prime color reflected by said first light reflecting surface, transmitting linear polarized light oscillating in a second plane of oscillations perpendicular to said first plane of oscillations, transmitting linear polarized light oscillating in said first plane of oscillations of said light rays of said third prime color radiated via said third lens, and transmitting linear polarized light oscillating in said second plane of oscillations;

said second transmitting/ reflecting surface transmitting said light rays of the first prime color, reflecting linear polarized light oscillating in said first plane of oscillations of said light rays of the second prime color, and transmitting linear polarized light oscillating in said first plane of oscillations of said light rays of the third prime color radiated via said third lens and linear polarized light oscillating in

said second plane of oscillations; said first and second transmitting/ reflecting surfaces being arranged for intersecting each other in the configuration of a letter X;

a second beam splitter prism including a third transmitting/ reflecting surface and a fourth transmitting/ reflecting surface, said third transmitting/ reflecting surface reflecting linear polarized light oscillating in a first plane of oscillations of said light rays of the second prime color reflected by said second light reflecting surface, transmitting linear polarized light oscillating in said second plane of oscillations, transmitting linear polarized light oscillating in said first plane of oscillations of said light rays of said third prime color radiated via said fourth lens and transmitting linear polarized light oscillating in said second plane of oscillations, said fourth transmitting/ reflecting surface transmitting said light rays of the second prime color, reflecting linear polarized light oscillating in said first plane of oscillations of said light rays of the first prime color, and transmitting linear polarized light oscillating in said first plane of oscillations of said light rays of the third prime color radiated via said fourth lens and linear polarized light oscillating in said second plane of oscillations; said third and fourth transmitting/ reflecting surfaces being arranged for intersecting each other in the configuration of a letter X; and

a wavelength plate arranged between said first beam splitter prism and said second beam splitter prism for converting linear polarized light, oscillating in said second plane of oscillations of said light rays of the first prime color, transmitted

through said first transmitting/ reflecting surface, into linear polarized light oscillating in said first plane of oscillations, and for converting linear polarized light oscillating in said second plane of oscillations of said light rays of the second prime color transmitted through said third transmitting/ reflecting surface into linear polarized light oscillating in said first plane of oscillations; said first beam splitter prism and said first triangular prism being arranged close to each other via an air layer, said second beam splitter prism and said second triangular prism being arranged close to each other via an air layer and said first beam splitter prism and said second beam splitter prism being arranged close to each other via said wavelength plate and an air layer;

said first beam splitter prism mixing linear polarized light oscillating in respective first planes of oscillations of said light rays of the first and second prime colors and linear polarized light rays oscillating in said first plane of oscillations and said second plane of oscillations of said light rays of the third prime color to form white light, and radiating the so formed white light;

said second beam splitter prism mixing linear polarized light rays oscillating in respective first planes of oscillations of said light rays of the first and second prime colors and linear polarized light oscillating in said first plane of oscillations and said second plane of oscillations of said light rays of the third prime color to form white color, and radiating the so formed white color.

59. The backlight device according to claim 58 wherein the illuminating device further comprises an optical component operating so that, when light rays mixed

into white light rays by said first beam splitter prism and the second beam splitter prism are incident on a light incident surface of said light guide plate, said white light is guided by said optical component so that the totality of said white light radiated from said first beam splitter prism and said second beam splitter prism will be incident on said light incident surface of said light guide plate.

60. The backlight device according to claim 59 wherein said optical component is an optical block including a white light incident surface of the same shape as light radiating surfaces of said first beam splitter prism and said second beam splitter prism, radiating the white light, said white light radiated from said light radiating surface being incident on said white light incident surface, a white light radiating surface arranged opposite to said white light incident surface and having at least one side of a length equal to the thickness of said light guide plate, and a pair of reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said white light incident surface to said white light radiating surface as said white light undergoes total reflection.

61. The backlight device according to claim 59 wherein said optical component is a pair of reflective mirrors arranged with a preset tilt with respect to the direction of thickness of the light guide plate and adapted for guiding the white light radiated from the light radiating surfaces of said first and second beam splitter prisms to said light incident surface of said light guide plate as said white light is reflected.

62. The backlight device according to claim 59 wherein said optical component is

an optical block unit made up of a first optical block and a second optical block arrayed along the direction of thickness of said light guide plate;

said first optical block including a first white light incident surface on which is incident said white light radiated from light radiating surfaces of said first and second beam splitter prisms, a first white light radiating surface arranged opposite to said first white light incident surface and having at least one side of a length not larger than the thickness of said light guide plate, and a pair of first reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said first white light incident surface to said first white light radiating surface as said white light undergoes total reflection;

said second optical block including a second white light incident surface on which is incident said white light radiated from said light radiating surfaces of said first and second beam splitter prisms, a second white light radiating surface arranged opposite to said white light incident surface and having at least one side of a length not larger than the thickness of said light guide plate, and a pair of second reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said second white light incident surface to said second white light radiating surface as said white light undergoes total reflection; and wherein

said white light incident surface of said optical blocks, formed by said first and second light incident surfaces, is of the same shape as said light radiating

surfaces of said first and second beam splitter prisms; said first and second light radiating surfaces being arranged so as to be confined within said light incident surface of said light guide plate.

63. The backlight device according to claim 58 wherein said first lens, second lens, third lens and the fourth lens, possessed by said illuminating device, are spherical or aspherical lenses.

64. The backlight device according to claim 58 wherein said first lens, second lens, third lens and the fourth lens, possessed by said illuminating device, are provided with Fresnel lenses on light incident surfaces thereof.

65. The backlight device according to claim 58 wherein said first light source, second light source, third light source and the fourth lens, possessed by said illuminating device, are light emitting diodes (LEDs).

66. The backlight device according to claim 58 wherein said light incident surface of said light guide plate is a pair of opposite lateral sides thereof.

67. The backlight device according to claim 66 wherein, in case said light guide plate comprises a pair of opposite lateral sides of said light guide plate, as said light incident surfaces, the white light radiating surfaces of said plural illuminating devices arranged at said preset interval on one of said light incident surfaces and the white light radiating surfaces of said plural illuminating devices arranged at said preset interval on the other of said light incident surfaces are arranged with an offset of one half pitch, without facing one another, with said light guide plate in-between.

68. The backlight device according to claim 58 wherein said light incident surface of said light guide plate is one of lateral sides thereof.

69. The backlight device according to claim 58 wherein a light diffusing area for changing the directivity of said white light obtained on color mixing by said color mixing means of said illuminating device so that said white light is diffused along the in-plane direction of said light guide plate is provided on said light incident surface of said light guide plate.

70. The backlight device according to claim 69 wherein said light diffusing area is formed by bonding a light diffusing sheet and a prism sheet in superposition on said light incident surface of said light guide plate.

71. The backlight device according to claim 69 wherein a reflecting area for reflecting the white light guided in said light guide plate so that said white light guided will not leak outward from said light guide plate is provided in a region other than said light diffusing area on said light incident surface.

72. The backlight device according to claim 71 wherein said reflecting area is formed by bonding a reflective sheet in place.

73. A backlight device including a light guide plate guiding the light rays incident from a light incident surface of the light guide plate as said light rays undergo total reflection by a light radiating surface and a light reflecting surface as one and the other of the major surfaces of the light guide plate, said light guide surface radiating the light rays by in-plane light radiation from said light radiating surface,

said backlight device comprising

a plurality of illuminating devices provided at a preset interval on the light incident surface side of said light guide plate, said illuminating devices each including

a first light source for radiating light rays of a first prime color;

a second light source for radiating light rays of a second prime color;

a third light source for radiating light rays of a third prime color;

a first lens for refracting divergent light rays contained in said light rays of the first prime color radiated from said first light source;

a second lens for refracting divergent light rays contained in said light rays of the second prime color radiated from said second light source;

a third lens for refracting divergent light rays contained in said light rays of the third prime color radiated from said third light source;

a first reflecting plate having a light reflecting surface for reflecting said light rays of the first prime color radiated via said first lens;

a first beam splitter plate having a first wavelength selecting transmitting/ reflecting surface which transmits light rays of the first prime color reflected by said light reflecting surface possessed by said first reflecting plate and which reflects said light rays of the second prime color radiated via said second lens;

a second beam splitter plate having a second wavelength selecting transmitting/ reflecting surface which transmits light rays of the third prime color

radiated via said third lens and which reflects light rays of said first and second prime colors, radiated via said first beam splitter plate, said second beam splitter plate mixing the light rays of said first, second and third prime colors to form white light; and

an optical plate having an angle selecting transmitting/ reflecting surface which reflects light rays incident thereon at an angle not less than a preset angle of incidence and which transmits light rays incident thereon at an angle less than said angle of incidence, said optical plate being arranged in rear of said second beam splitter plate so as to traverse an optical axis formed by said third lens and said second beam splitter plate, said optical plate radiating said white light obtained by color mixing by said second beam splitter plate.

74. The backlight device according to claim 73 further comprising

an optical component operating so that, when light rays mixed into white light rays by said second beam splitter prism and radiated from said optical plate are incident on said light incident surface of said light guide plate, said white light radiated from said optical plate will be guided by said optical component so that the totality of said white light radiated from said optical plate will be incident on said light incident surface of said light guide plate.

75. The backlight device according to claim 74 wherein said optical component is an optical block includes a white light incident surface of the same shape as the light radiating surface of said optical plate radiating the white light, said white light radiated from said light radiating surface being incident on said white light incident

surface of said light guide plate, a white light radiating surface arranged opposite to said white light incident surface and having at least one side of a length equal to the thickness of said light guide plate, and a pair of reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said white light incident surface to said white light radiating surface as said white light undergoes total reflection.

76. The backlight device according to claim 74 wherein said optical component is a pair of reflective mirrors arranged with a preset tilt with respect to the direction of thickness of the light guide plate and adapted for guiding the white light radiated from the light radiating surface of said optical plate to said light incident surface of said light guide plate as said white light is reflected.

77. The backlight device according to claim 74 wherein said optical component is an optical block unit made up of a first optical block and a second optical block arrayed along the direction of thickness of said light guide plate;

said first optical block including a first white light incident surface on which is incident said white light radiated from the light radiating surface of said optical block, a first white light radiating surface arranged opposite to said first white light incident surface and having at least one side of a length not larger than the thickness of said light guide plate, and a pair of first reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said first white light incident surface to said first white light radiating surface as said white light undergoes total

reflection;

said second optical block including a second white light incident surface on which is incident said white light radiated from said light radiating surface of said optical plate, a second white light radiating surface arranged opposite to said white light incident surface and having at least one side of a length not larger than the thickness of said light guide plate, and a pair of second reflective surfaces arranged with a preset tilt with respect to the direction of thickness of said light guide plate and adapted for guiding said white light incident from said second white light incident surface to said second white light radiating surface as said white light undergoes total reflection; and wherein

a white light incident surface of said optical block, formed by said first and second white light incident surfaces, is of the same shape as said light radiating surface of said optical plate; said first and second white light radiating surfaces being arranged so as to be confined within said light incident surface of said light guide plate.

78. The backlight device according to claim 73 wherein said first lens, second lens, third lens and the fourth lens, possessed by said illuminating device, are spherical or aspherical lenses.

79. The backlight device according to claim 73 wherein said first lens, second lens, third lens and the fourth lens, possessed by said illuminating device, are provided with Fresnel lenses on light incident surfaces thereof.

80. The backlight device according to claim 73 wherein said illuminating device

includes a second reflecting plate for reflecting said light rays of the first prime color, not incident on said first beam splitter plate, in a direction in which the light rays are incident on said first beam splitter plate, and a third reflecting plate for reflecting said light rays of the first prime color, not incident on said second beam splitter plate, in a direction in which the light rays are incident on said second beam splitter plate.

81. The backlight device according to claim 80 wherein said second reflecting plate has a reflecting surface reflecting said white light guided through said light guide plate into the bulk of the light guide plate so that said white light will not leak outward from said light guide plate.

82. The backlight device according to claim 73 wherein said first light source, second light source and the third light source, possessed by said illuminating device, are light emitting diodes (LEDs).

83. The backlight device according to claim 73 wherein said light incident surface of said light guide plate is a pair of opposite lateral sides thereof.

84. The backlight device according to claim 83 wherein, in case said light guide plate comprises a pair of opposite lateral sides of said light guide plate, as said light incident surfaces, the white light radiating surfaces of said plural illuminating devices arranged at said preset interval on one of said light incident surfaces and the white light radiating surfaces of said plural illuminating devices arranged at said preset interval on the other of said light incident surfaces are arrayed with an offset of one half pitch, without facing one another, with said light guide plate

in-between.

85. The backlight device according to claim 73 wherein said light incident surface of said light guide plate is one of said paired lateral sides.

86. The backlight device according to claim 73 wherein a light diffusing area for changing the directivity of said white light obtained on color mixing by said second beam splitter of said illuminating device so that said white light will be diffused along the in-plane direction of said light guide plate is provided on said light incident surface of said light guide plate.

87. The backlight device according to claim 86 wherein said light diffusing area is formed by bonding a light diffusing sheet and a prism sheet in superposition on said light incident surface of said light guide plate.

88. The backlight device according to claim 86 wherein a reflecting area for reflecting the white light guided in said light guide plate so that said white light guided will not leak outward from said light guide plate is provided in a region other than said light diffusing area on said light incident surface.

89. The backlight device according to claim 88 wherein said reflecting area is formed by bonding a reflective sheet in place.

90. The backlight device according to claim 73 wherein said light diffusing area for diffusing the directivity of said white light, obtained by color mixing by said second beam splitter plate, in the in-plane direction of said guide plate is provided on a light radiating surface of said optical plate of said illuminating device,

radiating said white light.

91. The backlight device according to claim 90 wherein said light diffusing area is formed by bonding a prism sheet on the light radiating surface of said optical plate radiating said white light.

92. The backlight device according to claim 73 wherein said first reflecting plate possessed by said illuminating device is a film on which there has been formed said light reflecting surface reflecting said light rays of the first prime color by vapor-depositing a reflective film in position.